

Evaluating SRS Environmental Monitoring Data

Effluent monitoring data, gathered where contaminants are released, are the most accurate source of information about releases from the Savannah River Site

(SRS). Environmental monitoring data, gathered from the environment surrounding the site, provide important information about site releases that support the SRS Environmental Dose Reconstruction Project.

Where and when are effluent and environmental monitoring data collected?

Effluent monitoring data are collected where releases occur. For example, air samples taken from inside a stack releasing contaminants are effluent monitoring data.

Environmental monitoring data are measurements taken from samples collected around the SRS. Environmental samples can be taken from air, water, sediment, soil, plants, animals, and animal products. The samples can be gathered at different locations, periods of time, and frequencies.

How will the environmental monitoring data be gathered in Phase II of the project?

One of the important tasks in the SRS Environmental Dose Reconstruction Project is to search for historical environmental data related to the site and determine how the data can be used to support dose reconstruction estimates. While the search

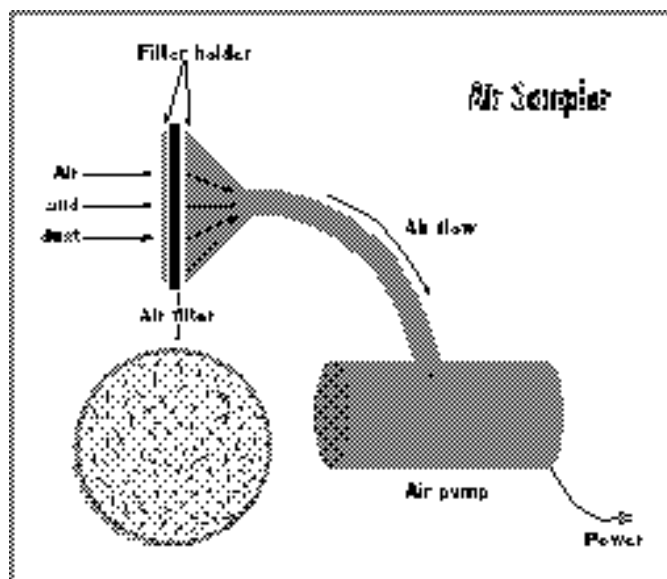


Figure 1. Air Sampler: The pump draws air through a filter, trapping almost all of the particles. The filter is removed regularly and analyzed.

will focus on documents and records identified during Phase I of the project, data gaps may require gathering additional records.

What types of data support the dose reconstruction project?

Radiological Assessments Corporation scientists will search for data that substantiate reported releases of effluents or

identify unreported releases. For example, radionuclides detected in air samples at onsite and offsite locations can confirm the presence and quantity

of radionuclides reported elsewhere as airborne source terms. In addition, sudden increases in radionuclide concentrations in the air sample record could indicate an unplanned release. Special monitoring conducted following an unplanned release can clarify the magnitude and extent of the release. Samples collected over long periods of time, such as soil samples, can trace

cumulative changes in long-lived contaminants.

The scientists will also search for data that provide specific information on doses received by people offsite. For example, radionuclides measured in milk and other food, including wild game, can provide direct data on ingestion doses.

The source term describes how much, when, where, and in what form material was released.

Why are environmental monitoring data so important?

Environmental monitoring data are a crucial component to a dose reconstruction because they contain a record of materials released from the site. When conducting a dose reconstruction project, they can be used to (a) check the quality of effluent (source) monitoring data and estimated release concentrations, (b) estimate source terms when effluent monitoring data are not available, and (c) derive data to be used in a model.

Environmental monitoring data can be useful for determining the accuracy of source term estimates. Figure 2 provides an example of this approach, taken from a site at Fernald, Ohio, for another dose reconstruction study. If environmental monitoring data have been collected regularly over a long period of time, they can be compared with release concentrations estimated using source term and environmental transport computer models.

When effluent monitoring data are not available (for example, when there was open burning of contaminated materials, or fugitive emissions from a waste area), environmental monitoring data may be used

to estimate a source term. The disadvantage of this approach is that additional data are unlikely to exist for checking the accuracy of the estimate.

Depending on the nature and quality of the environmental monitoring data, they may be used to derive a specific parameter required for a model calculation or to quantify a specific transport mechanism.

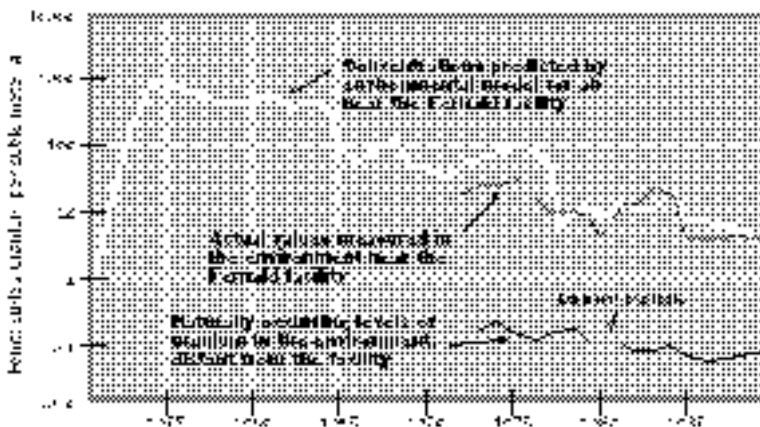


Figure 2. Computer models are used to estimate the movement and environmental concentrations of materials released from nuclear or chemical facilities. In this example, a model's predictions, based on known release rates, were compared to actual air concentration measurements taken after 1971. Then the same model was used to estimate environmental concentrations prior to that time. The results may be used to calculate the possible effects of early releases from the facility on people living nearby the site.

curie (Ci): A unit of measure used to express the amount of radioactive material present. It measures the number of atoms of a radioactive element that decay each second. One curie is 37 billion atoms undergoing radioactive decay each second. The curie is a traditional unit that has been replaced by the becquerel (Bq) in the International System of Units (SI). One becquerel is one radioactive decay per second. Therefore, 1 Ci is 37 billion Bq which can also be written as $1 \text{ Ci} = 37 \times 10^9 \text{ Bq}$. A **picocurie (pCi)** is one trillionth of a curie or $1 \times 10^{-12} \text{ Ci}$. A **femtocurie (fCi)** is one quadrillionth of a curie or $1 \times 10^{-15} \text{ Ci}$.



What are some of the difficulties of using environmental monitoring data?

It is not always easy to determine the quality and reliability of environmental monitoring data, especially if there are no other data available for comparison. Fortunately, some environmental monitoring data were collected independently by more than one organization, providing an opportunity to check and compare the data.

Monitoring data collected at locations distant from the site are important for distinguishing between releases of radionuclides from the SRS and from the worldwide contribution of atmospheric weapons testing. Figure 3 shows the results of tritium monitoring by the U.S. Geological Survey in two surface water streams in North Carolina and Georgia in the 1960s. The impact of weapons testing fallout and SRS releases is clear.

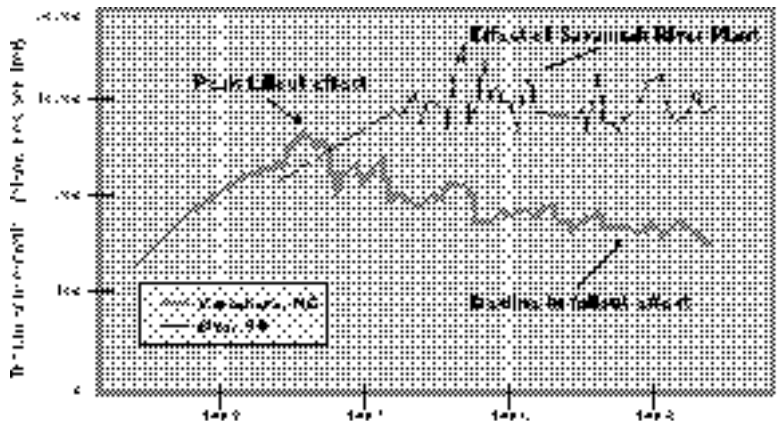


Figure 3. Tritium was measured in two different streams: (1) downstream of the Savannah River Plant which has released tritium regularly over the year and (2) far from the Plant and influenced by no known local tritium sources. The difference between the two graphed lines shows the influence of the Savannah River Plant on tritium concentrations in the river. This information can be used to model river concentrations for tritium and other released materials; to estimate concentrations at times when measurements were not made; and to calculate the effects of the Plant on individuals using the river as a source of drinking water.



How will the data be evaluated?

An important component of this task is determining the accuracy of the historical data. To evaluate the data, RAC scientists will search for descriptions of how the environmental samples were collected and

processed before analysis and the analysis techniques. Old records that report problems and note times when new methods and techniques were introduced will provide clues to the quality and accuracy of the data.

An Open, Public Process

Public input is critical to this project. We encourage your input and attendance at public meetings to stay informed on the progress of the research. Public meetings will be held in the areas surrounding the SRS and will be announced in each newsletter.

The Centers for Disease Control and Prevention, *Radiological Assessments Corporation*, and South Carolina State University scientists will provide clear and accessible information to the public.

Newsletters and fact sheets will be published regularly to provide updates on the progress of the research. Detailed technical information, including copies of the Phase I database describing research material discovered through June 1995, is available upon request.

An address for inquiries and comments is located on the outside cover of this newsletter. Individuals with information related to the study are encouraged to call the SRS Dose Reconstruction Project toll-free telephone number, 800-637-4766.

PUBLIC WORKSHOP

Savannah River Site

Environmental Dose Reconstruction Project

Thursday, July 25, 1996, 7-9:00 pm

**Holiday Inn Coliseum
630 Assembly Street
Columbia, South Carolina 29201**



conducted by

**The National Center for Environmental Health, Centers for Disease Control and Prevention,
and Radiological Assessments Corporation**

The Savannah River Site (SRS) Dose Reconstruction Project supports research that evaluates past releases of radioactive materials and chemicals from the SRS to the surrounding environment. Phase I of the project involved searching the site to identify and retrieve important documents. Phase II will use this information to calculate chemical and radiological source terms and determine intake pathways (eating, drinking, and inhalation) for people who lived in the SRS area. This workshop will focus on identifying and evaluating environmental data to support dose reconstruction. Individuals with information of possible value to the study are encouraged to attend.

Workshops are open to the public for observation and comment, limited by space available. The meeting rooms will accommodate approximately 50 people. Parking fees will be waived for those attending public workshops.

For more information, contact Mr. Paul Renard, Centers for Disease Control and Prevention, 4770 Buford Highway, NE (MS F35), Atlanta, GA 30341-3724, Phone: 770-488-7040 or Fax: 770-488-7044.

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